

The Butterflies of Santa Ana Island, with Descriptions of New Taxa from San Cristobal Island, Solomon Islands

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Abstract

A catalogue of butterflies occurring on Santa Ana Island is submitted, comprising subspecies and associated distributions. Larval food-plants and species habits are included. Four new taxa, comprising two species and two subspecies, are figured and described from San Cristobal (or San Cristoval) Island; one new status, *Phalanta exulans* is sunk to the subspecies of *P. alcippe*, is included. Further figures include maps of San Cristobal and Santa Ana, and photographs of the lesser known taxa.

Introduction

The Solomons (fig. 2) consist of ten large islands, which describe a double chain extending through 1400 km of the south-west Pacific, with a total land area of 29600km². The main islands, in which Bougainville may be included faunally (if not politically) comprise: Shortlands, Choiseul, Vella Lavella, Kolombangara, New Georgia, Santa Ysabel, Guadalcanal, Florida, Malaita and San Cristobal. Outlying islands include: Ontong Java, Rennell and Bellona, Santa Cruz and the Reef and Duff groups.

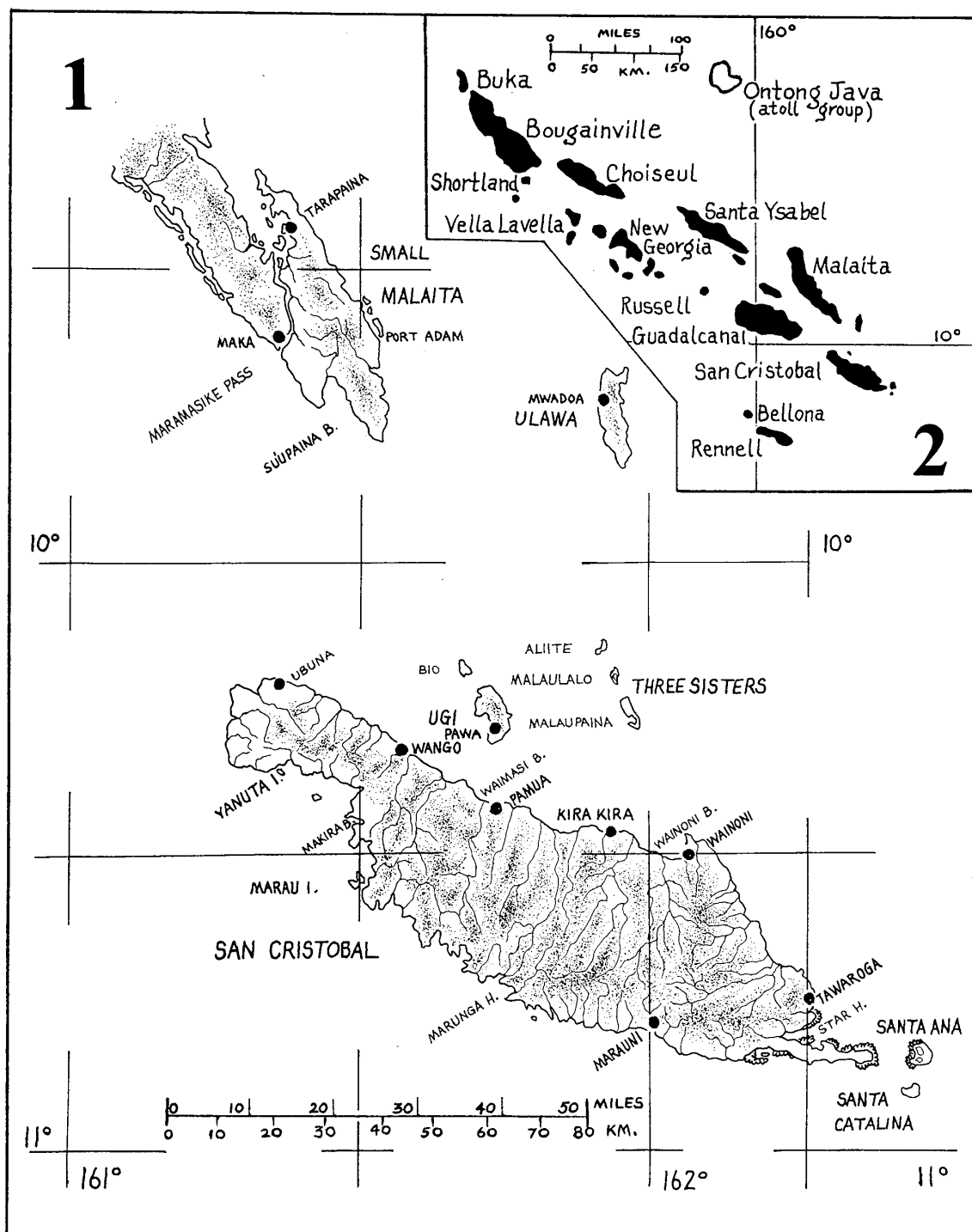
North of the Solomons, close natural affinities are evident in New Ireland and New Hanover, while to the south closely related Lepidoptera are recognised in the Banks and Torres islands, and New Hebrides proper.

San Cristobal and Subsidiaries (Fig. 1)

The main island is 125 km long and 40 km wide; well compared with Guadalcanal, although the former is less mountainous, its highest point being 1250 m. The mountain ranges form north to south ridges across, rather than along the island.

The area is climatically well defined, the south-east season may persist from April to November, during which relatively low temperatures are experienced with a minimum of precipitation. Highest mean and maximum temperatures are usually recorded during the north-west season—November to April, accompanied by humid gusty conditions; rare cyclonic activity is also possible in this season. Temperatures recorded at Kira Kira between 1965 and 1970, ranged from an average minimum of 22.2°C to an average maximum of 29.6°C. The southern coast, like that of Guadalcanal, is very exposed to prevailing southerly winds and is, in consequence, wetter than the north coast.

Subsidiary islands include Ugi, Three Sisters, Santa Catalina and Santa Ana; the latter being of special interest—some results of studies made between April and December 1974 being included in this paper. Santa Ana (Fig. 3) is 15 km in circumference and has a native population of approximately 1000. Following a severe hur-



Figs. 1-2. (1) The San Cristobal group of islands, south of Malaita. (2) Bougainville and the Solomons (excluding Santa Cruz) showing the position of San Cristobal.

ricane in December 1971, Santa Catalina and Santa Ana were devastated; forest trees uprooted or completely defoliated, as was the understory of scrub, vines and strand vegetation. Regeneration proceeded, primarily with the proliferation of herbs and woody plants, normally inhibited by the dark forest canopy. Insects associated with such plants, particularly Coleoptera, also dominated for a period; however, as

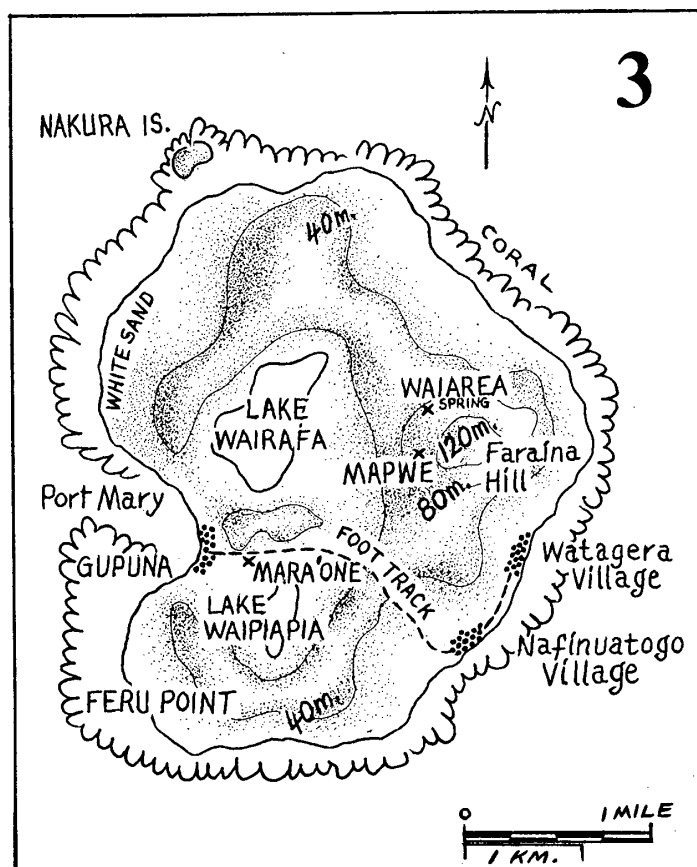


Fig. 3. Santa Ana Island, showing localities recorded in this paper.

the ecosystem re-established itself under the heavy year-round rainfall, such inhabitants became less apparent. At present there are remnants of primary forest growth on volcanic Faraina Hill; elsewhere at elevated points, hurricane damage has affected the forest. Central and north-west areas are mainly scrub and gardens, while forest dominates the extreme west and north sides of the island. The peaty margin of Lake Waipiapia and parts of Lake Wairafa are fringed with moss-forest, the latter location having suffered considerable hurricane damage.

Systematics

The following is in no way a comprehensive list of the butterflies to be found in the San Cristobal group of islands. With the exception of HesperIIDae, the area has been well documented with reference to specimens in the British Museum (Natural History) by D'ABRERA (1971). The present treatment is essentially a catalogue of those taxa occurring on Santa Ana, an island from which few records are known; in addition, hitherto unrecorded taxa are described, principally from San Cristobal.

Regarding larval food-plants, I am unable to locate many specific references to such, and in most instances have listed possible, but unconfirmed food-plants present in the Solomons. These may at least provide a basis for studies in the field.

The San Cristobal group has not been documented to the extent of other Solomon

islands, and with regard to Lepidoptera research in the field, the archipelago is virtually unknown. Listed below are collectors of the material recorded throughout this paper:—

BROWN, E. S. (1955) Santa Ana, also islands to the north and Santa Cruz. DRAKE, Capt. P. F. (1964–65) Principally on San Cristobal. HOLLINS, Dr. F. R. (1954–56) Medical Officer at Kira Kira (San Cristobal) and Lwowa (Santa Cruz). LEVER, R. A. (1931–36) Government Entomologist. Travelled extensively throughout the Solomons, making a further visit in 1954. Lately of the Commonwealth Institute of Entomology, London. LOW, W. R. M. (1963–64) District Commissioner Eastern District, Kira Kira, San Cristobal. Collected within the District south to Santa Cruz. MEEK, A. S. (1908) Spent a short period on San Cristobal, regarding it as a poor locality; specimens were sent to W. ROTHSCCHILD. WOODFORD, C. M. (1897–1914) First Resident Commissioner, British Solomon Islands Protectorate. Prior to his official appointment, had spent three years in the Solomons; in 1886 began collecting for the British Museum (Natural History), basing himself at Aola, Guadalcanal.

To assist workers in locating illustrations of taxa mentioned in this paper, page references are included from two major sources: D'ABRERA (1971) and McCUBBIN (1971). The following abbreviations are employed, being suffixed to specimen locality data: BM. British Museum (Natural History); SM. Saruman Museum, Beckley, Sussex; HEC. Hope Entomological Collections, University Museum, Oxford.

Catalogue of species

Hesperiidae

Badamia exclamationis FABRICIUS

1775, Syst. Ent., 530. Fig.: McCUBBIN (1971: 154).

Distribution: India, S. E. Asia, Moluccas, New Guinea, Australia, Solomons, Santa Cruz, New Hebrides, New Caledonia, Fiji, Samoa, Gilbert & Ellice Is., Marquesas.

Data: 1 ♀ Gupuna, Santa Ana, feeding on *Wedelia* flowers in scrub, 28. 7. 1974. SM.

Larval food-plants: *Terminalia*, possibly *brassi* EXELL., *calamansanai* BLCO., *catappa* L., *complanata* K. SCHUM., *copelandii* ELMER, *kaernbachii* WARB., *kajewskii* EXELL., *latielata* C. T. WHITE, *megalocarpa* EXELL., *samoensis* RECH., *solomonensis* EXELL., *steeniana* EXELL. (Combretaceae).

Larvae sometimes gregarious, causing marked defoliation.

Adults haunt open country or forest perimeters in shaded situations. The species is very rapid in flight, frequenting flowers and settling high up; does not appear to come to water.

Cephrenes augiades FELDER

1860, Stiz. Math. Nat. Akad. Wiss. Wien, 40: 46. Fig.: McCUBBIN (1971: 172).

Distribution: Australia, Solomons.

Data: 2 ♂ Feeding on tree blossom 15 ft (4.5 m) high, Mara'one, scrub area, Santa Ana, 12. 12. 1974. SM.

Larval food-plants: *Imperata* Cyr. (Graminae). Occasional defoliator of young palms.

The adult is rapid and darting in flight, preferring sunny places, coming to flowers or resting on shrubs. Not seen at water.

Papilionidae

Graphium codrus CRAMER

1779, Pap. Exot. 2, 127: 179. Fig.: D'ABRERA (1971: 118).

Distribution: Moluccas, New Guinea, Bismarcks, Solomons.

Subspecies: *pisidice* GODMAN & SALVIN

1888, Ann. Mag. nat. Hist., (6), 1: 100.

Distribution: Bougainville, Solomons—Shortlands, Choiseul, Malaita, Florida, Guadalcanal, San Cristobal, Santa Ana.

Data: 1 ♂ Santa Ana, 22. IV. 1955, E. S. BROWN, BM. Reference was also made to the holotype ♂ of *G. codrus christobalus* JORDAN (1909) in BM, with data: Yanuta, San Christoval, 19–29. IV. 1908, A. S. MEEK. This taxon appears to be synonymous with *pisidice*.

Larval food-plants: Possibly *Annona* L. (Annonaceae), *Diploglottis* HOOK (Sapindaceae), *Macaranga* THOUARS. (Euphorbiaceae).

Very fast in flight; often comes to moisture in beachside situations. Further *Graphium* species observed on Santa Ana include *sarpedon* L. (1758: 461) and *agamemnon* L. (1758: 462).

Papilio fuscus GOEZE

1779, Ent. Beytr., (3), 1: 87. Fig.: D'ABRERA (1971: 95–96), McCUBBIN (1971: 132).

Distribution: Andamans, S. E. Asia, Moluccas, New Guinea, Australia, Bismarcks, Solomons.

Subspecies: *xenophilus* MATHEW

1886, Proc. zool. Soc. Lond., 348.

Distribution: Solomons—New Georgia group, Ysabel, Guadalcanal, San Cristobal.

Data: 1 ♂ San Cristobal. BM. I am unable to locate previous records of *P. fuscus* from this island.

Larval food-plants: *Morinda* L. (Rubiaceae), *Citrus* L., *Microcitrus* SWINGLE, *Halfordia* F. MUELL., *Fagara* L. (Rutaceae).

Pachliopta polydorus LINNAEUS

1763, Amoen. Acad., 6: 401. Fig.: D'ABRERA (1971: 80–81).

Distribution: Moluccas, New Guinea, Australia, Bismarcks, Solomons.

Subspecies: *polydaemon* MATHEW

1887, Trans. ent. Soc. Lond., 48.

Distribution: Solomons—Ugi, San Cristobal, Santa Ana.

Data: 1 ♀ Wairarea, 200 ft (61 m), secondary forest, 8.4.1974, Santa Ana. SM.

D'ABRERA (1971) mentions this subspecies as occurring on the northern Solomons: Bougainville, Shortlands. HOWARTH (1975) reviews *P. polydorus* from the Solomons and confirms that *polydaemon* is restricted to the San Cristobal group; *polypemon* MATHEW (1887: 49) is present from Bougainville south to Guadalcanal and Malaita. A third subspecies, *ulawaensis* JOICEY & TALBOT (1917), seems restricted to Ulawa.

Larval food-plant: *Aristolochia tagala* CHAM. (Aristolochiaceae).

Ornithoptera species

Ornithoptera priamus urvilleanus GUÉRIN (1829) has not been recorded from San Cristobal or Santa Ana; however, *O. victoriae epiphanes* SCHMID (1970) is known from the former. There were stories of *Ornithoptera* occurring on Santa Ana prior to the 1971 cyclone; the only definite record made recently was by Oscar KAPER during the last week of January 1976: a female *O. v. epiphanes* was seen 400 m east of Gupuna at Mara'one, on the south-east coastal strip of strand forest and secondary scrub. In this area a possible larval food-plant occurs—*Aristolochia tagala*, which is widespread throughout the Solomons and New Guinea.

Papilio ulysses LINNAEUS (1758) has yet to be recorded from the San Cristobal group; the species ranges from the Moluccas, Australia, New Guinea and the Bismarcks, south to Guadalcanal. It is however possible that this or further representatives of Papilionidae occur on Santa Ana, in elevated patches of undisturbed rain-forest, remote from coastal and scrub areas.

Pieridae

Terias hecabe LINNAEUS

1764, Mus. Ulric., 249. Fig.: D'ABRERA (1971: 162), McCUBBIN (1971: 112).

Distribution: India, S. E. Asia, Moluccas, New Guinea, Australia, Solomons, New Hebrides, New Caledonia, Fiji, Loyalties, Micronesia, Tonga.

Subspecies: *nivaria* FRUHSTORFER

1910, in Seitz, Gross Schmett. Erde, 9: 168.

Distribution: Bougainville and the Solomons, including Rennell Is.

Data: 2 ♂ Scrub, Lake Waipiapia area, Santa Ana, 11.12.1974. BM.; 1 ♂ east of Lake Wairafa, Santa Ana, 14.12.1974. SM.; 1 ♀ Mara'one 100 ft (30 m), in forest glade, Santa Ana, 10.12.1974. SM.

Larval food-plants: *Albizia* DURAZZ., *Cassia* L., *Sesbania* ADANS., *Indigofera* L., *Leucaena* BENTH. (Leguminosae), *Phyllanthus* L. (Euphorbiaceae), *Capparis* L. (= *Breynia* L.) (Capparidaceae).

Flies in open country and secondary growth, often congregating at water.

Lycaenidae***Arhopala araxes* FELDER**

1865, Reise Novara, 2: 224. Fig.: D'ABRERA (1971: 311), McCUBBIN (1971: 99, as *Narathura araxes*).
 Note: *Arhopala* Boisduval (1832) predates *Narathura* MOORE (1879).

Distribution: Moluccas, New Guinea, Australia, Bismarcks, Solomons, New Hebrides.

Subspecies: *eurisus* DRUCE

1891, Proc. zool. Soc. Lond., 370, pl. 32, figs. 11–12.

Distribution: Bismarcks, Solomons, New Hebrides.

Data: 1 ♀ Littoral forest south of Gupuna, Santa Ana, 21.12.1974. SM.

Larval food-plants: *Terminalia*, possibly *brassi* EXELL., *calamansanai* BLCO., *catappa* L., *complanata* K. SCHUM., *copelandii* ELMER, *kaernbachii* WARB., *kajewskii* EXELL., *latielata* C. T. WHITE, *megalocarpa* EXELL., *samoensis* RECH., *solomonensis* EXELL., *steenisiana* EXELL. (Combretaceae), *Cryptocarya*, possibly *alleniana* C. T. WHITE, *cordata* C. K. ALLEN, *globosa* C. K. ALLEN, *kajewskii* C. K. ALLEN, *medicinalis* C. T. WHITE, *roemeri* LTB., *scalariformis* C. K. ALLEN, *umbonata* C. K. ALLEN (Lauraceae), *Faradaya* F. MUELL. (Verbenaceae), *Heritiera*, possibly *littoralis* AIT., *solomonensis* KOSTERM. (Sterculiaceae), *Glochidion* J. B. & G. FORST. (Euphorbiaceae), *Cordia* L. (Ehretiaceae), *Hibiscus*, possibly *rosa-sinensis* L., *tiliaceus* L. (Malvaceae), *Syzygium* GAERTN. (= *Acmena* DC.) (Myrtaceae), *Cupaniopsis* RADLK. (Sapindaceae).

***Deudorix epijarbas* MOORE**

1857, Cat. Lep. Mus. East Ind. Co., 32. Fig.: D'ABRERA (1971: 302), McCUBBIN (1971: 105).

Distribution: India, S. E. Asia, Moluccas, New Guinea, Australia, Bismarcks, Solomons, New Caledonia, New Hebrides, Fiji, Samoa, Tonga.

Subspecies: *woodfordi* DRUCE

1891, Proc. zool. Soc. Lond., 371, pl. 32.

Distribution: Solomons.

Data: 1 ♂ Low flying over grassland late afternoon, Gupuna, Santa Ana, 30.6.1974. SM.

Larval food-plants: *Harpulla*, possibly *arborea* BLCO., *cupanioides* ROXB., *largifolia* RADLK., *peekeliara* MELCH., *vaga* MERR. & PERRY (Sapindaceae).

Very fast darting flight, often returning to the same place and settling high up. Visits flowers, but apparently not water.

***Nacaduba kurava* MOORE**

1877, Ann. Mag. nat. Hist., (4), 20: 341. Fig.: D'ABRERA (1971: 346), McCUBBIN (1971: 90).

Distribution: India, S. E. Asia, Moluccas, Australia, New Guinea, Bismarcks, Solomons.

Subspecies: *euretes* DRUCE

1891, Proc. zool. Soc. Lond., 360, pl. 31, fig. 7.

Distribution: Solomons.

Data: 2 ♂ Littoral scrub south of Gupuna, Santa Ana, 21.12.1974. BM.; 1 ♂ 1 ♀ Secondary scrub, Lake Waipiapia, Santa Ana, 11.12.1974. SM.

Larval food-plants: *Maesa* FORSK., *Rapanea* AUBL. (Myrsinaceae), *Cupaniopsis* RADLK., *Alectryon* GAERTN. (Sapindaceae). Larvae feed on or in buds and shoots. Similar flight and resting habits to *D. epijarbas*.

***Erysichton lineata* MURRAY**

1874, Trans. ent. Soc. Lond., 524, fig. 9. Fig.: D'ABRERA (1971: 349), McCUBBIN (1971: 90).

Distribution: Moluccas, ? New Guinea, Australia, Bismarcks, Solomons.

Subspecies: *vincula* DRUCE

1891, Proc. zool. Soc. Lond., 363, pl. 31: 18.

Distribution: Solomons.

Data: 1 ♂ 1 ♀ Littoral forest south of Gupuna, Santa Ana, 21.12.1974. SM.

Larval food-plants: *Bursaria* CAV. (Pittosporaceae), *Alectryon* GAERTN., *Cupaniopsis* RADLK. (Sapindaceae), *Acacia* MILL. (Leguminosae), *Rapanea* AUBL. (Myrsinaceae), *Trema* LOUR. (Ulmaceae). Larvae feed on flower buds.

***Jamides celeno* CRAMER**

1775, Pap. Exot., 1: 31.

Distribution: India, S. E. Asia, Moluccas, New Guinea, Bismarcks, Solomons, Santa Cruz, New Hebrides.

Subspecies: *sundana* FRUHSTORFER

1921, Arch. Natg. 81, A6, 1916: 5. Fig.: D'ABRERA (1971: 353).

Distribution: Moluccas: Kei, Buru, Banda; New Guinea, Bismarcks, Solomons.

Data: 1 ♂ Scrub east of Lake Wairafa, Santa Ana, 14.12.1974. SM.; 1 ♀ Gupuna, Santa Ana, 31.3.1974. SM.; 1 ♀ Littoral scrub south of Gupuna, Santa Ana, 21.12.1974. BM.

Larval food-plants: *Canavalia* ADANS., *Sesbania* ADANS., *Dolichos* L. (Leguminosae).

The adult favours open country and light woodland. Flight is very weak and low, occasionally settling close to the ground; sometimes visits flowers, but seldom water.

***Luthrodes cleotas* GUÉRIN**

1838, Voy. Coquille, 18: 4. Fig.: D'ABRERA (1971: 380).

Distribution: Moluccas, New Guinea, Bismarcks, Solomons, Loyalties, New Caledonia, New Hebrides.

Subspecies: *gades* FRUHSTORFER

1915, Iris, 48.

Distribution: Solomons.

Data: 1 ♂ Santa Ana Is., Solomon Is., Woodford. Godman & Salvin coll., 1908-168. BM.; 1 ♀ Gupuna, Santa Ana, 13.6.1974. SM.; 1 ♀ Mara'one, Santa Ana,

egg-laying on *Cycas rumphii*, 3.1.1975. SM.; 1 ♂ 1 ♀ Yanuta, San Christoval, 19–25. IV.1908, Meek. BM.

Larval food-plant: *Cycas rumphii* MIQUEL (Cycadaceae).

Libytheidae

Libythea geoffroyi GODART

1820, Mem. Soc. Linn. Paris, V. 2, Lep. 2. Fig.: D'ABRERA (1971: 252), McCUBBIN (1971: 65).

Distribution: S. E. Asia, Moluccas, New Guinea, Australia, Bismarcks, Loyalties, New Caledonia, Solomons—Guadalcanal, Rennell, San Cristobal.

L. g. eborinus subsp. n. (Fig. 6)

Distribution: Solomons—San Cristobal.

Holotype: ♂, N. San Cristoval. (Possibly collected by W. R. M. Low, 1963–1964.) BM.

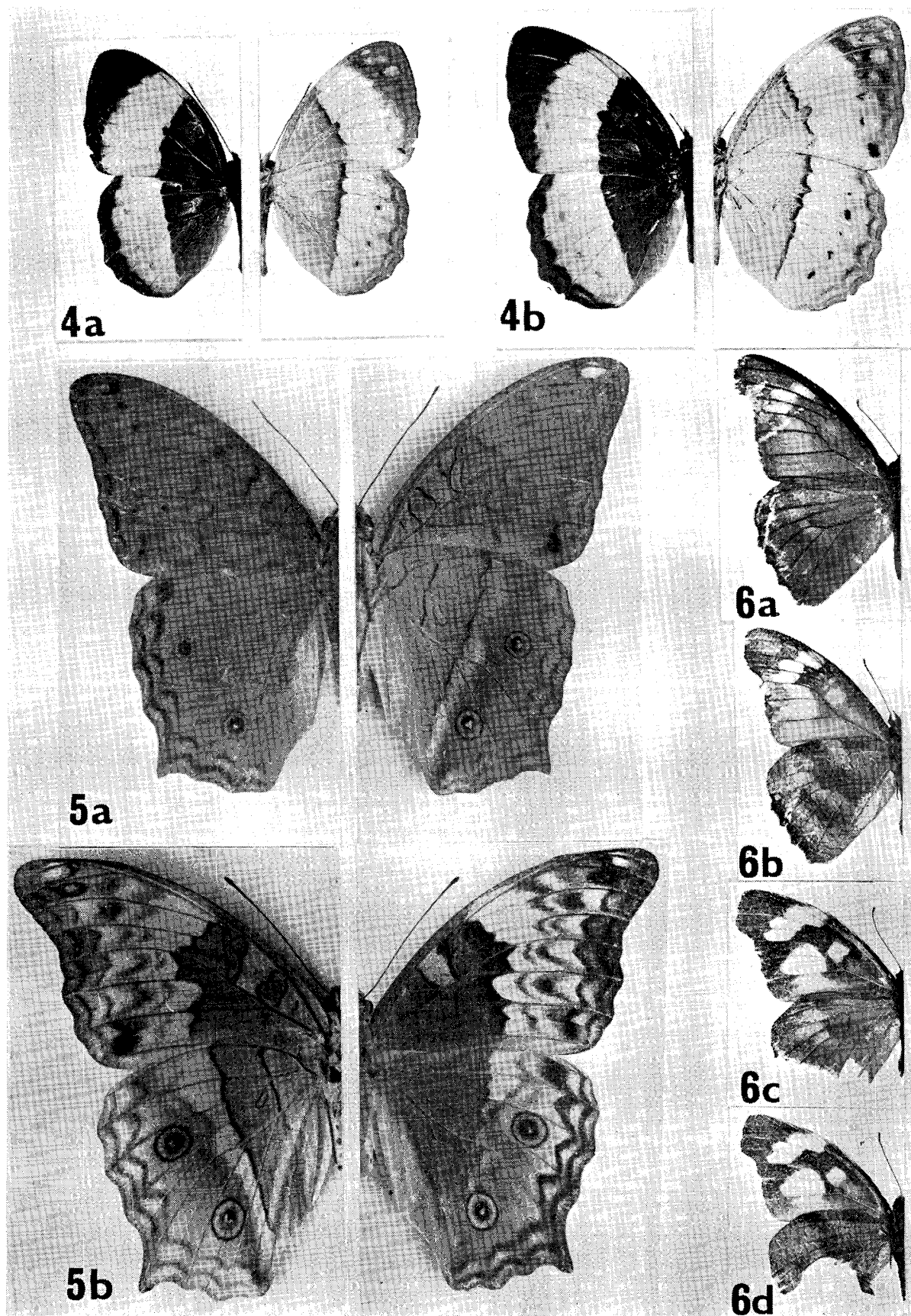
Description:— Forewing length—30 mm. Dorsal surface—Forewing violet ground colour suffused with grey-black costally; dark venational scaling well defined. Extensive white subapical band occupying spaces 4, 5 and 6; also a suggestion of faint white bars in spaces 2 and 3 and below the discocellulars, although more pronounced on the ventral surface. Hindwing violet mainly restricted to the discal cell. Broad grey-black submarginals extending almost to the discocellulars, being terminated by the intrusion of a faint white discal band, more appreciable on the ventral surface. Dark venational scaling is pronounced. Ventral surface—Forewing light brown, diluted with grey at base and dorsum; suffused costally, apically and marginally. Broad white discal band extending from space 2 to the costa, also an ill-defined white spot below the discocellulars. Postbasal streak is white. Hindwing is darker brown than forewing, interrupted by three grey bands: postbasal, discal and marginal, these being vaguely mottled with brown.

Allotype ♀ N. San Cristoval. (Possibly collected by W. R. M. Low, 1963–1964.) BM.

Description:— Forewing length—30 mm. Dorsal surface—Forewing ground colour dark brown. Broad white subapical band occupying spaces 4 to the costa, also one large median spot in space 2 plus a smaller one in space 3; a much diluted spot occurs in 1a, streaked towards the cubitus. Spot below the discocellulars is well defined. Hindwing ground colour is lighter than that of the forewing, suffused submarginally; white discal band ill-defined, radiating from the discocellulars. Ventral surface—Similar distribution of pattern to that of the dorsal surface, but lighter brown; hindwings are mottled.

Remarks: The pattern of *g. eborinus* compares well with that of both sexes of *g. ceramensis* WALLACE (1869) and *g. batchiana* WALLACE (1869), from the Moluccas; however, in females of these subspecies the markings are orange, not white as in *g. eborinus*. Regarding female colouration, the Bismarcks subspecies *pulchra* BUTLER (1882) is closest, although lacking in extent.

Definition of the name *eborinus*: Ivory white, graduating to a cream tint.



Larval food-plant: Possibly *Celtis* L. or other genera of the family Ulmaceae.

Libythea geoffroyi seems to be a local insect, inhabiting thickly wooded areas and occasionally open country. The species is known to congregate by streams; flight is short and rapid, settling with wings closed, affording possible protection through cryptic colouration.

It is of interest to note that in the Marquesas occurs *Libythea collenettei* POULTON & RILEY (1928); a small species approximating the Nymphalid, *Phalanta alcippe* CRAM. in colouration and size. There are two females in BM. taken by C. L. COLLENETTE (St. George Expedition) at Nuka Hiva, 18.1.1925.

Acraeidae

Between 1974 and 1978 Geoff DENNIS observed twelve examples of *Miyana moluccana* FELDER (1860) at beachside locations on Santa Ana; the insects appeared solitary in habit. It is possible that this species employs *Passiflora* and/or *Adenia* (Passifloraceae) as larval food-plants; at least one species of the former occurs on Santa Ana, often forming dense canopy-cover on low beachside trees. In addition to its occurrence on the above island, *M. moluccana* is recorded from Sulawesi (Celebes), Sula, Buru, Ambon, Ceram, Bachan, the Bismarck Archipelago, Woodlark, Bougainville, Shortlands and Guadalcanal. Figured by D'ABRERA (1971: 199).

Nymphalidae

Phalanta alcippe CRAMER

1780, Pap. Exot., 4. Fig.: D'ABRERA (1971: 201, 203), MCCUBBIN (1971: 64).

Distribution: India, S. E. Asia, Moluccas, N. W. Australia, New Guinea, Bismarcks, Bougainville, Solomons (including Rennell & Bellona), Samoa.

Note: Previously regarded as a good species, *P. alcippe exulans* HOPKINS (1927) **status n.** occurs on Samoa, and is distinguished by a broad black band at the forewing discocellulars. Holotype male is in BM.: Samoa, J. F. MATHEW, Joicey Bequest. The taxon relates closest to *a. quinta* FRUHSTORFER (1904) from Halmaheira, Moluccas.

Subspecies: **ephyra** GODMAN & SALVIN

1888, Ann. Mag. nat. Hist., (6), 1: 97.

Distribution: Bougainville, Solomons—Shortlands, New Georgia (also possibly islands to the south and east), ? San Cristobal, Santa Ana.

Data: 2 ♂ 5 ♀ Mara'one, forest glade 100 ft (30 m), Santa Ana, 27.7.1974. SM.;

Figs. 4–6. Specimens are almost natural size. Nymphalidae: (4a) *Cupha aureus* sp. n., holotype, ♂ (dorsal & ventral) Yanuta, S. Cristoval, 19–29. IV. 1908, A. S. MEEK. (4b) *C. aureus*, allotype, ♀ (dorsal & ventral), data as for holotype. Both specimens are in BM. (5a) *Vindula arsinoe catenes*, ♂ (dorsal & ventral), Gupuna, scrub area, Santa Ana, 13.7.1974. (5b) *V. arsinoe catenes*, ♀ (ventral & dorsal), data as for ♂ but 1.8.1974. Both specimens are in Saruman Museum. Libytheidae: (6a) *Libythea geoffroyi eborinus* subsp. n., holotype, ♂ (dorsal); (6b) holotype, ♂ (ventral) N. San Cristoval, W. R. M. Low, 1963. (6c) *L. geoffroyi eborinus*, allotype, ♀ (dorsal), data as for holotype; (6d) ventral surface of same. Both specimens are in BM.

3 ♂ as above but 10.12.1974. BM.; 1 ♀ Littoral forest, Feru, Santa Ana, 21.12.1974. BM.; 2 ♀ Gupuna, beachside scrub, Santa Ana, 4.7 & 28.7.1974. BM.

Although the species exhibits slight seasonal variation, i.e. larger and darker in the wet season, there is also individual variability in the width of the wings. Larger examples of both sexes have less rotund wings and possess, to a greater degree, violet suffusion on the dorsal surface and silver ventrally.

Larval food-plants: *Flacourtia*, possibly *rukam* Z. & M., *zippelii* SLOOT (Flacourtiaceae), *Salix* L. (Salicaceae), also Violaceae.

The adult is rather weak in flight and prefers sunny situations.

Vindula arsinoe CRAMER

1777, Pap. Exot., 2: 160. Fig.: D'ABRERA (1971: 205), McCUBBIN (1971: 56).

Distribution: India, S. E. Asia, Moluccas, Australia, Bismarcks, New Guinea, Solomons—San Cristobal group.

Subspecies: *catenes* GODMAN & SALVIN (Fig. 5)

1888, Ann. Mag. nat. Hist., (6), 1: 96.

Distribution: Solomons—Ugi, San Cristobal, Santa Ana.

Data: 1 ♂ S. Cristoval, iii. 1970, D. M. WILSON. BM.; 1 ♂ S. Cristoval, north coast, Wainoni, Jan. 1964, W. R. M. Low. BM.; 1 ♀ N. W. S. Cristoval, Ubuna, ix. 1963, W. R. M. Low, BM.; 2 ♀ S. Cristoval, north coast, Dec. 1963 to Feb. 1964, W. R. M. Low. BM.; 1 ♂ 1 ♀ S. Cristoval, A. S. MEEK. BM.; 1 ♀ Ugi, 1910, ex GROSE-SMITH. BM.; 1 ♂ 1 ♀ Gupuna, scrub area, Santa Ana, 13.7.1974 & 1.8.1974. SM.

This taxon appears midway between *V. arsinoe ada* BUTLER (1874)—N. E. Australia and *V. sapor* GODMAN & SALVIN (1888, 1: 95)—Solomons. In some characters *a. catenes* is closer allied to *sapor*, particularly in the distribution of the hindwing ocelli relative to the submarginal band, the crescent shapes of which further enforce this alliance.

While males of *sapor* possess white scaling in hindwing spaces 2, 3 and 4, certain females are suffused in these areas; *a. catenes* lacks white hindwing patches in both sexes but otherwise conforms closely to *sapor*. *V. arsinoe clodia* GODMAN & SALVIN (1888) from Ulawa is well compared with *a. catenes*; likewise, *a. meridionalis* TALBOT (1932) from Rossel (Lousiades).

Larval food-plants: *Passiflora*, possibly *foetida* L., *moluccana* BL., *Adenia* FORSK. (Passifloraceae).

Cupha aureus sp. n. (Fig. 4)

Distribution: Solomons—San Cristobal.

Holotype: ♂, Yanuta, S. Cristoval, 19–29.IV.1908, A. S. MEEK. BM.

Description:—Forewing length—30 mm. Dorsal surface—Ground colour deep brown basad and black-brown marginally. Broad yellow bands on both wings. Forewing has a vague suggestion of subapical spotting; the discal band extends almost to the tornus, while in the closely related species *C. prosope* FABRICIUS (1775), this

area is usually punctuated with black submarginals in spaces 1a and 1b. Black spots occurring in spaces 2 and 3 are poorly defined. Hindwing yellow band extends distad, permitting a relatively narrow black-brown marginal band. A suggestion of discal spotting is present in spaces 2, 3 and 5 but is very rudimentary in space 4. Ventral surface—Straw coloured basals separated from the darker distal margin by dilute lemon bands, duplicating in expanse those of the dorsal surface. Inner perimeter of bands is edged with black-brown, diminishing towards the dorsum. Forewing subapical spots continue down into spaces 3 and 2, vaguely punctuating the discal band; the submarginal crescents are rudimentary. There is a faint black streak coincidental to the discocellulars. Hindwing black discal spotting is more apparent than on the dorsal surface, but still very rudimentary in space 4; submarginal crescents are more regular than those of the forewing.

Allotype: ♀, Yanuta, S. Cristoval. 19–29. IV. 1908, A. S. MEEK. BM.

Description:— Forewing length: 35 mm. Forewing margins are more linear than those of the male, and consequently appear broader; also the ground colour is slightly lighter, the basals being brick-red to brown. Black discal spotting is better defined than in the male. Dorsal surface—Hindwing exhibits faint suggestions of submarginal yellow crescents, primarily in spaces 2 and 3. Ventral surface—Hindwing exhibits minor black scaling along the discocellulars.

Paratypes: 1 ♂ 1 ♀, Yanuta, S. Cristoval, 19–29. IV. 1908, A. S. MEEK. BM.; 1 ♂, S. Cristoval, north coast, Wainoni, Jan. 1964, W. R. M. LOW (BM. 1964–148); 1 ♀, Br. Sol. Is., S. Cristoval, Kira Kira, 18. XI. 1964, Capt. P. F. DRAKE (BM. 1965–566).

Remarks: An interesting characteristic of this taxon is the lack of silver-grey crescents which, in subspecies of *C. prosope* are present on the ventral surface, around the fore and hindwing submarginal spots and peripheral areas. On the dorsal surface, *C. aureus* is well compared with *C. prosope madestes* HEWITSON (1859) from the Aru Islands; however, the latter possesses narrower discal bands.

Definition of the name *aureus*: Pure yellow.

As noted the species described herein is closely allied to *Cupha prosope* and thus, details are given for comparison: Distribution—Moluccas, Australia, New Guinea, Trobriands, D'Entrecasteaux Archipelago. Figured by D'ABRERA (1971: 200) and McCUBBIN (1971: 63). Larval food-plants possibly applicable to *C. aureus*: *Flacourtia rukam* Z. & M., *F. zippelii* SLOOT, *Scolopia* SCHREB. (Flacourtiaceae), *Breynia* T. R. & G. FORST. (Euphorbiaceae). The adult of *prosope* is low and unsustained in flight; these characteristics may thus apply to *aureus*.

Precis hedonia LINNAEUS

1764, Mus. Ulric., 279. Fig.: D'ABRERA (1971: 210).

Distribution: Moluccas, Australia, New Guinea, Bismarcks, Solomons (including Rennell & Bellona).

Subspecies: *zelima* FABRICIUS

1775, Syst. Ent., 492: 212. Fig.: McCUBBIN (1971: 50).

Distribution: Kei, Aru, Misol, Waigeu, north & east Australia, New Guinea,

Bismarcks, Solomons.

Data: 1 ♂ 1 ♀ In scrub, Gupuna, Santa Ana, 6. 7. 1974. SM.; 1 ♂ In scrub, Gupuna, Santa Ana, 23. 12. 1974. BM.

Larval food-plant: *Ruellia* L. (Acanthaceae). The species flies throughout the year.

***Precis villida* FABRICIUS**

1787, Mant. Ins., 2: 35. Fig.: D'ABRERA (1971: 211), McCUBBIN (1971: 48).

Distribution: Moluccas, New Guinea, Australia, Solomons, Santa Cruz, New Hebrides, New Caledonia, Loyalties, Norfolk Is., Fiji, Samoa, Tonga, Tokelau, Tuamotus, Societies.

Data: 2 ♂ Gupuna, in scrub, Santa Ana, 23. 12. 1974. SM.; 1 ♂ 1 ♀ Gupuna, in scrub, Santa Ana, 6. 7. 1974 & 28. 7. 1974. SM.; 1 ♀ Mara'one, common on scrub & grass flats, Santa Ana, 10.12.1974. BM.; 1 ♂ Littoral scrub, Feru, Santa Ana, 21.12. 1974. BM.

Larval food-plants: *Plantago* L. (Plantaginaceae), *Centaurium* HILL (Gentianaceae), *Antirrhinum* L. (Scrophulariaceae), *Convolvulus* L., *Ipomoea* L. (Convolvulaceae), *Verbena* L. (Verbenaceae), *Scaevola* L. (Goodeniaceae). Larvae feed at night. The species flies throughout the year.

All stages of this species show close relationships to the American *Junonia lavinia* CRAMER, examples of which were bred on *Plantago* by the author during late 1977, notably at the Cotopaxi volcano (Ecuador), c. 4000 m.; the subspecies present was *vestina* FELDER, an insect of the arid-zone, and exceedingly similar in pattern and colouration to that of *villida*.

***Hypolimnas antilope* CRAMER**

1779, Pap. Exot., 2: 183. Fig.: D'ABRERA (1971: 218).

Distribution: S. E. Asia, Moluccas, north-west Australia, New Guinea, Solomons (including Rennell Is.), New Caledonia, New Hebrides, Fiji, Samoa, Tonga, Cook Is.

Subspecies: *scopos* GODMAN & SALVIN

1888, Ann. Mag. nat. Hist., (6), 1: 98.

Distribution: Solomons.

Data: 1 ♀ Gupuna, scrub, Santa Ana, 24.7.1974. SM.

Larval food-plant: *Pipturus* WEDD. (Urticaceae).

***Hypolimnas alimena* LINNAEUS**

1764, Mus. Ulric., 291. Fig.: D'ABRERA (1971: 219, 221), McCUBBIN (1971: 54).

Distribution: Moluccas, New Guinea, Australia, Bismarcks, Solomons (including Rennell & Bellona).

Subspecies: *fuliginescens* MATHEW

1887, Trans. ent. Soc. Lond., 44, pl. 4, fig. 6.

Distribution: Solomons—Ugi, San Cristobal, Santa Ana.

Data: 2 ♂ 1 ♀ Garden clearings in forest, east of Lake Wairafa, Santa Ana, 14.12.1974. SM.; 1 ♂ 1 ♀ Scrub, west side of Lake Wairafa, Santa Ana, 15.12.1974 (in BM. fig. by HOWARTH 1976); 1 ♀ Littoral scrub, Feru, Santa Ana, 21.12.1974. SM.; 1 ♀ Gupuna, scrub area near beach, Santa Ana, 1.8.1974. SM.; 7 ♂ 3 ♀ San Cristoval, 19.IV.1908, A. S. MEEK. BM.; 1 ♀ San Cristoval, Kira Kira, 19.XI.1964, Capt. P. E. DRAKE. BM.; 3 ♂ October 1932, Solomon Is., Santa Ana, R. A. LEVER. HEC.

This species is in need of revision and several 'subspecies' placed in synonymy. *H. a. fuliginescens* shows closest alliance to *a. heteronympha* RÖBER (1891) from the Kei Islands; the latter being differentiated by greater expanse of the submarginals, particularly in females.

Larval food-plants: *Pseuderanthemum*, possibly *bicolor* RADLK., *mullerifernandi* LINDAU, *pacificum* LINDAU (Acanthaceae). Larvae feed at night. The species flies throughout the year.

Hypolimnias bolina LINNAEUS

1764, Mus. Ulric., 295.

Distribution: India, S. E. Asia, Moluccas, New Guinea, Australia, Solomons, Santa Cruz, New Hebrides, New Caledonia, Loyalties, Norfolk Is., Fiji, Micronesia, Loyalties, Norfolk Is., Fiji, Micronesia, Gilbert & Ellice Is., Samoa, Tonga, Niue, Cook Is., Gambier, Kermadec, Marquesas, Rapa, Societies, New Zealand.

Subspecies: *nerina* FABRICIUS

1775, Syst. Ent. 509: 227. Fig.: D'ABRERA (1971: 221-222), McCUBBIN (1971: 52-53).

Distribution: S. E. Asia, Moluccas, New Guinea, Australia, New Zealand, Bismarcks, Solomons, Santa Cruz.

In the New Hebrides, New Caledonia and Fiji the *nerina* pattern appears to be generally diluted; such examples may be worthily designated as constant geographical forms of *nerina*, i.e. *pulchra* BUTLER (1874). Such characters are best evaluated on examination of females, whereas males from different localities are difficult to separate.

Data: 1 ♂ 1 ♀ Gupuna, Santa Ana, 29.6 & 29.7.1974. SM. (♀ has semi-obsolete dorsal pattern); 2 ♀ Mara'one, in scrub & grassland, Santa Ana, 23.12.1974. BM.; 1 ♀ Mara'one, cultivated garden area near Gupuna, Santa Ana, 4.1.1975. SM.—Obsolete dorsal pattern; 1 ♂ October 1932, Solomon Is., Santa Ana, R. A. LEVER. HEC.

Larval food-plants: *Systasia* BLUME, *Pseuderanthemum*, possibly *bicolor* RADLK., *mullerifernandi* LINDAU, *pacificum* LINDAU, *Ruellia*, possibly *arvensis* S. MOORE, *guppyi* HEMSL. (Acanthaceae), *Ipomoea* L. (Convolvulaceae), *Pipturus* WEDD. (Urticaceae), *Sida*, possibly *acuta* BURM., *rhombifolia* L. (Malvaceae), *Synedrella* GAERTN. (Compositae), *Phaseolus* L. (Leguminosae), *Alternanthera* FORSK. (Amaranthaceae), *Portulaca*, possibly *oleracea* L. (Portulacaceae). Larvae feed at night in open country, but sometimes during the day in shady situations.

The species is strong but not sustained in flight, occurring throughout the year.

Hypolimnias exiguus sp. n. (Fig. 7)

Distribution: Solomons—San Cristobal, Santa Ana.

Holotype: ♂, Mapwe, natural forest area, 200 ft (61 m), Santa Ana, 6.7.1974. SM.

Description:— Forewing length—37.5 mm. Dorsal surface—Forewing black-brown with sparse white scaling, forming a band at the cell apex. Three submarginal and two larger white spots are suggested in spaces 1 and 2. The hindwing is black-brown. A continuous pale orange distal band is punctuated with black (white centred) ocelli in spaces 1b to 7, vague or absent in space 4. A white discocellular patch parallels the distal band from spaces 1b to 5. Ventral surface—Ocelli and bands are better defined than on the dorsal surface; however, the hindwing distal orange is much diluted.

Allotype ♀ Gupuna, Santa Ana, 20.6.1974. SM.

Description:— Forewing length—45 mm. Wings are more undulate than those of the male, particularly the hindwings. Dorsal surface—Ground colour dark brown; white forewing band is broad and clear, from costa via cell apex to space 2. Sub-apical spots are well defined. Hindwing is similar to the male but spots are complete and slightly lanceolate, particularly in spaces 5 and 6. White discocellular band parallels the extent of the orange band. Ventral surface—Ocelli and bands are duplicated from the dorsal surface, but more prominent due to the light brown ground colour. White hindwing band is dominant, the pale orange band being modified, only evident around the black ocelli.

Paratypes: 1 ♂ Gupuna, Santa Ana, 3.7.1974. BM.; 1 ♀ S. Cristoval, Kira Kira, 19. XI. 1964, Capt. P. E. DRAKE. BM.; 1 ♀ S. Cristoval, Solomon Isles, A. S. MEEK. BM.

Remarks: The species herein described is intermediate in pattern between *H. deois* HEWITSON (1858) and *H. octocula* BUTLER (1869), the known ranges of which are given for comparison: *deois*—Kei, Aru, Waigeu, New Guinea, Karkar, Fergusson, Trobriands. Fig. D'ABRERA (1971: 223); *exiguus*—Solomons: San Cristobal, Santa Ana; *octocula*—? Palau, ? Marianas, ? Carolines, Banks, New Hebrides, Loyalties, New Caledonia. Fig. D'ABRERA (1971: 224).

Definition of the name *exiguus*: Small, but well proportioned.

Doleschallia bisaltide CRAMER

1779, Pap. Exot., 2: 102. Fig.: D'ABRERA (1971: 226), McCUBBIN (1971: 55).

Distribution: India, S. E. Asia, Moluccas, Australia, Bismarcks, Waigeu, Biak, ? New Guinea, Solomons (including Rennell), Santa Cruz, New Hebrides, New Caledonia, Loyalties, Fiji, Tonga.

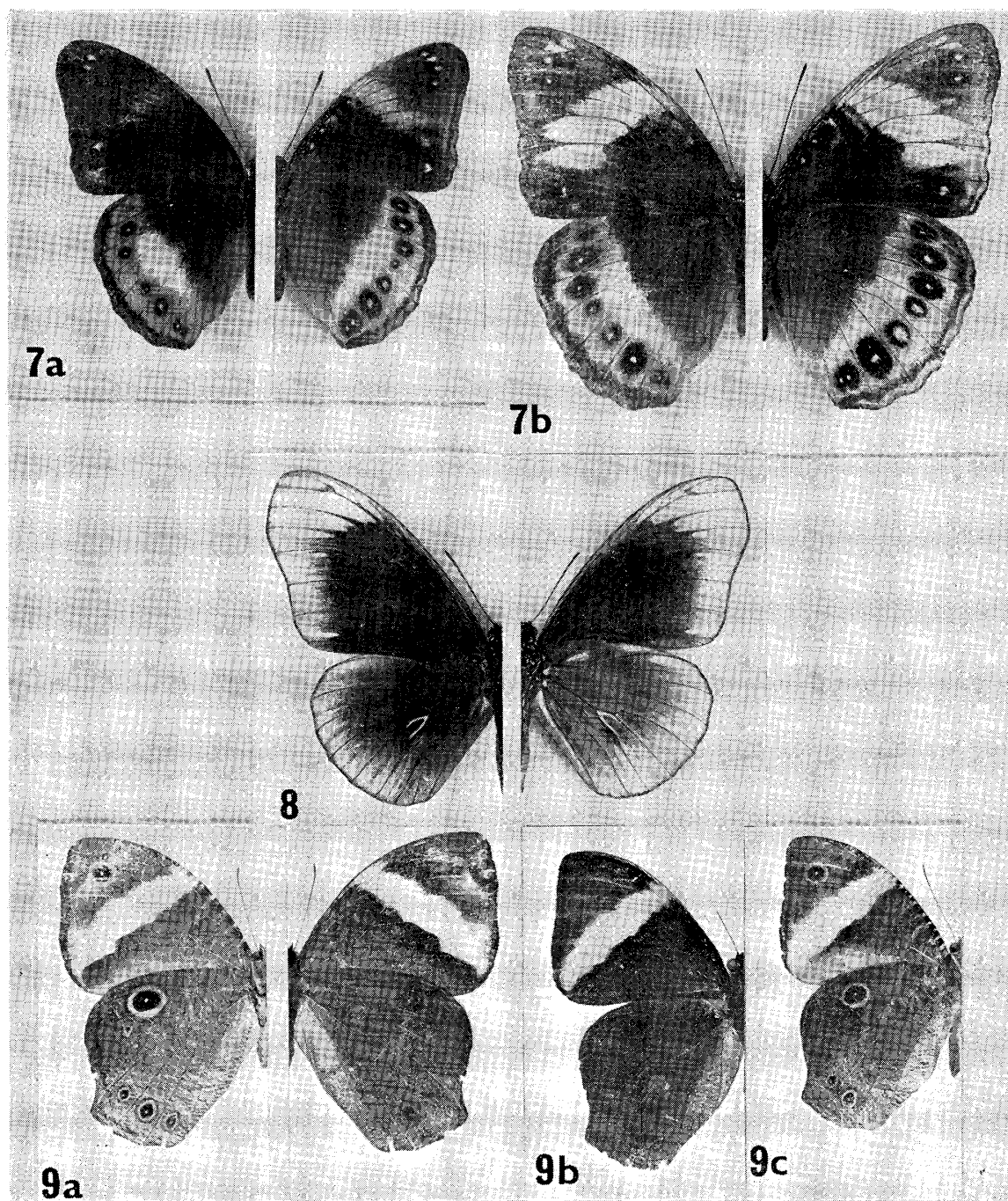
Subspecies: *menexema* FRUHSTORFER

1912, in Seitz, Gross Schmett. Erde, 9: 560.

Distribution: Solomons.

Data: 2 ♂ Rapid flier, native garden clearing, scrub area east of Lake Wairafa, Santa Ana, 14.12.1974. SM.; 1 ♀ Pamua, San Cristoval, 12.1963, W. R. M. Low. BM.

Larval food-plants: *Graptophyllum* NEES., *Pseuderanthemum*, possibly *bicolor* RADLK., *mullerifernandi* LINDAU, *pacificum* LINDAU (Acanthaceae), *Artocarpus* J. R. & G. FORST. (Moraceae), *Erythrina* L. (Leguminosae). Larvae are night feeders, sometimes during the day in shady places. On Guadalcanal 1975, larvae were observed



Figs. 7-9. Specimens are slightly reduced. Nymphalidae: (7a) *Hypolimnastis exiguus* sp. n., holotype, ♂ (dorsal & ventral), Mapwe, natural forest area, 200 ft (61 m), Santa Ana, 6.7.1974. (7b) *H. exiguus*, allotype, ♀ (dorsal & ventral), Gupuna, Santa Ana, 20.6.1974. Both specimens are in Saruman Museum. Danaidae: (8) *Danaus euploeomorpha*, ♂ paratype (dorsal & ventral), Beachside near Gupuna, Santa Ana, 10.11.1974. In BM. Satyridae: (9a) *Melanitis amabilis cristobali* subsp. n., allotype, ♀ (ventral & dorsal), San Cristoval, north coast, Waimasi, January 1964, W. R. M. Low. (9b, c) *M. amabilis cristobali*, holotype, ♂ (dorsal & ventral) San Cristoval, Kira Kira, December 1963, W. R. M. Low. Both specimens are in BM.

feeding gregariously on the pink and green variegated leaf form of *Graptophyllum pictum* L. Adults emerged approximately twelve days after pupation, frequently about midday.

Adults are fast in flight, preferring damp forest; will come to water. A very variable species, prone to extensive infra-populational differences in the extent of black on the dorsal surface, within the forewing disc; also in the definition of white postbasal and submedian maculation on the ventral surface.

Parthenos sylvia CRAMER

1776, Pap. Exot. 1: 43. Fig.: D'ABRERA (1971: 239).

Distribution: India, S. E. Asia, Moluccas, New Guinea, D'Entrecasteaux Arch., Bismarcks, Solomons, Santa Cruz, New Hebrides.

Subspecies: *thesaurinus* GROSE-SMITH

1897, Ann. Mag. nat. Hist., 19: 177.

Distribution: Solomons—Ugi, San Cristobal, Santa Ana, Santa Catalina, Santa Cruz; ? New Hebrides.

Data: 1 ♂ Mara'one, scrub/sea level, Santa Ana, 28.7.1974. SM.; 8 ♂ Yanuta, San Cristoval, 19.IV–29.V.1908, A. S. MEEK, BM.; 1 ♂ 1 ♀ Kira Kira, San Cristoval, W. R. M. LOW, BM.; 3 ♂ Ugi, ex GROSE-SMITH. BM.

Specimens of *P. sylvia* from Ugi have hitherto been placed as subspecies *ugiensis* FRUHSTORFER (1913). A comparison drawn on specimens from Ugi and San Cristobal appears to place this name in synonymy.

Larval food-plants: *Adenia* FORSK. (Passifloraceae), *Tinospora* MIERS (Menispermaceae).

Amathusiidae

Taenaris phorcas WESTWOOD (1858), widely distributed from the Bismarck Archipelago to the Solomons (? excluding Santa Cruz), is not recorded from Santa Ana. Specimens were observed in shaded palm forest on San Cristobal, in the Star Harbour area seven miles north of Santa Ana. On the latter island four species of palms, other than the coconut *Cocos nucifera* L. occur naturally, i.e. *Metroxylon solomonense* WARB., *Licuala lauterbachii* DAMM. & K. SCHUM. and two species of *Areca* L.; these are only abundant in the vestigial natural rain-forest at higher elevations. The preceding are possible larval food-plants for present or future populations of *Taenaris* HÜBNER, and although not proven, it is suspected that Amathusiid larvae are occasional defoliators of young Malay dwarf hybrid coconut palms on Santa Ana. An instance of the defoliation potential of *Taenaris* is recorded in New Guinea but terfly—*T. myops kirschi* STAUDINGER (1887) on the banana, *Musa* L. (Szent-Ivany 1956). *T. phorcas* is figured by D'ABRERA (1971: 285).

Satyridae

Melanitis amabilis BOISDUVAL

1832, Voy. Astrolabe, **140**: 2, f. 1, 2. Fig.: D'ABRERA (1971: 263).

Distribution: Moluccas, ? Australia, Torres Strait Is., New Guinea, Bismarcks, Solomons—San Cristobal.

M. a. cristobali subsp. n. (Fig. 9)

Distribution: Solomons—San Cristobal.

Holotype: ♂, San Cristoval, Kira Kira, December 1963, W. R. M. Low. BM.

Description:— Forewing length—35 mm. Dorsal surface—Ground colour, brown-black suffusion. Forewing exhibits an oblique yellow discal band, narrower than that of the nominate subspecies from the Bismarcks. Hindwing margins exhibit only minor undulations, particularly at the termination of vein 4, giving the tornus an ill-defined rotund appearance. Ventral surface—Alternate russet and grey striations. Forewing differing from the nominate subspecies only in the narrower and better defined discal band. The hindwing ocelli are poorly developed in spaces 1a, 2 and 3.

Allotype: ♀, San Cristoval, north coast, Waimasi, January 1964, W. R. M. Low. BM.

Description:— Forewing length—37.5 mm. Dorsal surface—Lighter in ground colour than the male; forewing chocolate brown extending basally to the white discal band, which is not proportionately wider than that of the male. Hindwing exhibits little marginal undulation. Ventral surface—Russet and grey striations are diffuse and ill-defined, except costally. Hindwing ocelli are small as in the male.

Paratype: 1 ♀, San Cristoval, north coast, Waimasi, January 1964, W. R. M. Low. BM.

Larval food-plant: Not known to me; however, a related species—*M. leda* LINNAEUS (1758) is well recorded as feeding on various grasses, i.e. *Imperata* CYR. (Graminae). Adults of *M. amabilis* may exhibit similar habits to *leda*, in its unwillingness to fly in broad daylight, and may be more often encountered during dusk.

Mycalesis perseus FABRICIUS

1775, Syst. Ent., 488. Fig.: D'ABRERA (1971: 260), McCUBBIN (1971: 39).

Distribution: India, S. E. Asia, Moluccas, New Guinea, Australia, Solomons, Santa Cruz, New Hebrides.

Data: 2 ♂ Weak flying, grassland near Gupuna, Santa Ana, 14.12.1974. SM.

Larval food-plants: Various grasses (Graminae); larvae are nocturnal.

The adult insect is seasonally dimorphic, and for wet-season specimens exhibiting well developed ocelli and median bands on the ventral surface, f. *infuscata* WATERHOUSE & LYELL (1914) is available. Figured by McCUBBIN (1971: 39).

Danaidae***Danaus plexippus* LINNAEUS**

1764, Syst. Nat., 10: 471. Fig.: D'ABRERA (1971: 171), McCUBBIN (1971: 2).

Distribution: Canada, U.S.A., Central & South America, West Indies, Moluccas, New Guinea, Australia, Solomons (including Rennell), New Hebrides, Fiji, New Caledonia, Loyalties, Norfolk Is., Samoa, Tonga, Micronesia, Gilbert & Ellice Is., Marquesas, Societies, Hawaii, New Zealand; vagrant to Britain and Europe.

Distinct subspecies occur in Central America and northern South America: *p. megalippe* HÜBNER (1820), and the West Indies: *p. leucogyne* BUTLER (1884).

Data: 1 ♂ Mara'one, Santa Ana, 29.12.1974. SM.; 1 ♀ Egg-laying on *Asclepias*, scrub area, Mara'one, Santa Ana, 31.12.1974. SM.

Larval food-plants: *Asclepias curassavica* L., *Calotropis gigantea* WILLD. (Asclepiadaceae). During the hot, dry November and December, at which time few species are observed in numbers on Santa Ana, *plexippus* occurs abundantly, females ovipositing on *A. curassavica*.

The species has established itself on many island groups due to migratory and wandering habits.

***Danaus chrysippus* LINNAEUS**

1758, Syst. Nat., 10, 471: 81.

Distribution: Greece, Middle East, Old World tropics to Australia, New Zealand, New Guinea, Solomons, New Caledonia, Loyalties, New Hebrides, Fiji.

Subspecies: *petilia* STOLL

1790, in Cramer, Uitl. Kap., 132: 28, fig. 3. Fig.: D'ABRERA (1971: 171, as *c. petilea*), McCUBBIN (1971: 5).

Distribution: Australia, New Zealand, New Guinea, Solomons (? extent), New Caledonia, Loyalties, New Hebrides, Fiji. I am unable to locate Solomon Island specimens of *D. chrysippus* in BM.; however, observations of this insect have been conveyed to me from Vella Lavella (New Georgia group) and Santa Ana (San Cristobal group).

Data: 1 ♀ Scrub area, Mara'one, near Gupuna, Santa Ana, 30.12.1974. SM.

Larval food-plants: *Asclepias curassavica* L., *Marsdenia* R. BR. (Asclepiadaceae), *Campanula* L. (= *Pentatropis* RAFIN.) (Campanulaceae).

***Danaus philene* STOLL**

1782, Uitl. Kap., 4. Fig.: D'ABRERA (1971: 171).

Distribution: New Guinea, Bismarcks, Solomons (including Rennell & Bellona), Santa Cruz.

Subspecies: *insolata* BUTLER

1870, Ann. Mag. nat. Hist., (4), 5: 360, n. 2. Fig.: SMART (1975: 257).

Distribution: Solomons—San Cristobal, Santa Ana, Santa Catalina.

Data: 2 ♂ Weak flying in littoral forest near Feru, Santa Ana, 23.12.1974. SM.;

1 ♀ In forest clearing east of Lake Wairafa, Santa Ana, 14.12.1974. BM.—a male and female from this series were figured by HOWARTH (1976); 1 ♂ October 1932, Solomon Is., Santa Ana, R. A. LEVER. HEC.

D. p. insolata deviates considerably from the basic *philene* pattern, the marginal and submarginal spots being united as a broad band; forewing band is considerably modified, particularly apically, extending almost to the discal cell. Forewing shape is similar to that of *D. chrysippus*, being noticeably indented marginally at space 3, giving the apex a slender character. *D. p. insolata* exhibits an interesting parallel with *Danaus euploeomorpha* HOWARTH, *et al.*; other white banded butterflies found on San Cristobal and Santa Ana include the Nymphalid—*Hypolimnys alimena fuliginescens* MATHEW, and the Danaids—*Euploea boisduvali brenchleyi* BUTLER, *nechos prusias* GODMAN & SALVIN and *leucostictos imitata* BUTLER.

Larval food-plant: Probably of the family Asclepiadaceae. Adults of *philene* and other Danaids, feed on broken or dead twigs, particularly from shrubs and trees of the family Boraginaceae, i.e. *Tournefortia* (*Messerschmidia*) and *Heliotropium*; the subsequent intake of dehydropyrrolizidine alkaloides are thought to be utilized by males during courtship. From a colour transparency taken by A. M. JONES during the 1974 Aberdeen University Expedition to New Guinea, five males of *philene*, and one female of *Euploea callithoe* BOISDUVAL (1832) are depicted attending such a tree on Wogeo Island, West Sepik District.

***Danaus euploeomorpha* HOWARTH, KAWAZOÉ & SIBATANI (Fig 8)**

1976, Tyô to Ga, 27: 4.

Distribution: Solomons—San Cristobal, Santa Ana.

Data: 2 ♂ Beachside near Gupuna, Santa Ana, 10.11.1974. BM. Designated paratypes and figured by HOWARTH, *et al.*; 1 ♀ Solomon Islands, San Cristobal, Camp 4, mouth of Honi River, August 1965, Royal Society Expedition. BM.

Below is the type data for all males according to HOWARTH, *et al.*:—

Holotype: ♂, Solomon Islands, Santa Ana Is., Eastern District, 26.IX.1954, F. R. HOLLINS, BM. 1960–120. Gen. Prep. T. G. H. 1962–565, Type No. Rh.18620. Paratypes: 2 ♂ Solomon Islands, Santa Ana Is., beachside near Gupuna, BM. 1975–516. Type No. Rh.18621 & 18622; 1 ♂ Solomon Is., San Cristobal, Kira Kira, 12.V. 1966 (coll. K. SAKAGUCHI, Nishinomiya, Hyôgo-ken, Japan); 1 ♂ S. E. Solomon Is., San Cristobal, s.e. coastal strip, 4.XII.1969, R. STRAATMAN (coll. A. SIBATANI).

In addition to his observations of this insect near Gupuna, Santa Ana, Geoff DENNIS (pers. comm. 1978) records the species from the vicinity of Kira Kira, San Cristobal; on one occasion detecting a congregation of six examples, feeding on *Ixora* flowers.

Larval food-plants: Possibly *Parsonsia* R. BR. (Apocynaceae), *Tylophora* R. BR., *Marsdenia* R. BR. (Asclepiadaceae). The above food-plants are speculative and are those employed by the closely related species—*D. hamata* MACLEAY (1827); the subspecies *insignis* TALBOT (1943) flies on San Cristobal, also being observed in large numbers for only two days in June 1977, at beachside situations near Gupuna, Santa Ana.

***Euploea leucostictos* GMÉLIN**

1788, in LINNAEUS, Syst. Nat., 13, I, 5: 2289.

Distribution: Burma, Nicobars, S. E. Asia, Moluccas, New Guinea, Bismarcks, Solomons (including Rennell & Bellona), Santa Cruz, New Hebrides, New Caledonia, Fiji.

There seems little validity in separating *nemertes* HÜBNER (1806) from *leucostictos* as a species. Superficial differences occur in wing pattern when examples are examined from S. E. Asia and Melanesia; specimens from the west being predominantly blue-black, while those further east tend to be polymorphic, paralleling subspecies and forms of *Euploea stephensii* FELDER (1865), *E. tulliohus* FABRICIUS (1973), and other Lepidoptera which may fly in the same localities. Structural differences between *leucostictos* and *nemertes* appear negligible.

Subspecies: *imitata* BUTLER

1870, Ann. Mag. nat. Hist., (4), 5: 359, n. 8. Fig.: D'ABRERA (1971: 194, as subspecies of *nemertes*).

Distribution: Solomons—Ugi, Three Sisters, San Cristobal, Santa Ana.

Data: 2 ♂ 1 ♀ Shaded secondary forest/scrub, east of Lake Wairafa, Santa Ana, 14.12.1974. SM.; 1 ♂ 1 ♀ Beachside, Feru, Santa Ana, 23.12.1974. BM. Figured by HOWARTH (1976); 1 ♂ S. Ana Is., E. Dist., 26.IX.1954, F. R. HOLLINS. BM.; 3 ♂ 1 ♀ San Cristoval, ? W. R. M. Low, c. 1963. BM.

Larval food-plant: *Ficus* L. (Moraceae).

***Euploea treitschkei* BOISDUVAL**

1932, Voy. Astrolabe, 98. Fig.: D'ABRERA (1971: 185–186).

Distribution- New Guinea, Bismarcks, Solomons, Santa Cruz, New Hebrides, New Caledonia.

Form: *jessica* BUTLER

1869, Lep. Exot. 1: 20, t. 8, f. 3.

Distribution: Witu, New Britain, Louisiades, D'Entrecasteaux, San Cristobal, Santa Ana, Ugi, Banks, New Hebrides, New Caledonia. On the Solomons north of San Cristobal, f. *aenea* BUTLER (1882) appears to dominate.

Data: 2 ♂ Beachside scrub south of Gupuna, Santa Ana, 21.12.1974. BM.; 3 ♂ 2 ♀ As last but 29.6.1974. SM.

The above specimens relate to f. *jessica* in the regular, but not extended positioning of white spots on fore and hindwings. *E. treitschkei* exhibits many local forms, and frequent infra-populational variation.

Larval food-plant: *Hoya* R. BR. (Asclepiadaceae).

***Euploea boisduvali* LUCAS**

1853, Rev. Mag. zool., 2: 5. Fig.: D'ABRERA (1971: 183).

Distribution: Woodlark, Solomons (including Rennell & Bellona), Santa Cruz, New Hebrides, New Caledonia, Loyalties, Fiji.

Subspecies: *brenchleyi* BUTLER

1870, Ann. Mag. nat. Hist., (4), 5: 357, n. 2.

Distribution: Bougainville, Solomons—Rennell, Ugi, San Cristobal, Santa Ana.

Data: 2 ♂ 1 ♀ Shaded secondary forest/scrub, east of Lake Wairafa, Santa Ana, 14.2.1974. BM. Figured by HOWARTH (1976); 1 ♂ Beachside scrub, Feru, Santa Ana, 23.11.1974. SM.; 1 ♀ Mara'one, garden area, Santa Ana, 19.12.1974. SM.; 2 ♂ Santa Ana, Woodford, GODMAN & SALVIN coll. BM.; 1 ♂ South Sea, FELDER, ex DRUCE coll., GODMAN & SALVIN coll. BM.; 48 ♂ October 1932, Solomons Is., Santa Ana, R. A. LEVER. HEC.; 1 ♂ as before but Santa Catalina.

Additional specimens have been examined from Ugi and San Cristobal, collected by C. M. WOODFORD. From specimens studied, one male and one female (Santa Ana: 23.11 & 19.12.1974) comply with *E. boisduvali albomarginata* CARPENTER (1942), in their smaller size and wider white marginal bands. CARPENTER (1953) regarded such specimens, which fly with *boisduvali brenchleyi*, as a distinct race resultant possibly of a double migration and thus, today showing presence of autonomous subspecies. *B. brenchleyi* is distributed through San Cristobal northward, while *b. albomarginata* closely resembles *b. era* de NICÉVILLE (1902) from Santa Cruz in the south. Intrasub-specific variation in *boisduvali*, as in other Solomons *Euploea*, often produces transitional morphs, suggestive of a neighbouring subspecies. Such related characters may indeed be results of migration, as postulated by CARPENTER; however, it may also be a character which has existed in *b. brenchleyi*, maybe to a lesser extent since its supposed isolation as an island race, it no longer being able to form a transition over a continual land-mass.

Larval food-plant: *Hoya* R. BR. (Asclepiadaceae).

Euploea nechos MATHEW

1887, Trans. ent. Soc. Lond., 37.

Distribution: Solomons.

Subspecies: *prusias* GODMAN & SALVIN

1888, Ann. Mag. nat. Hist., (6), 1: 92. Fig.: D'ABRERA (1971: 183).

Distribution: Ulawa, Ugi, San Cristobal, Santa Ana.

Data: 2 ♂ 1 ♀ Beachside scrub, Feru, Santa Ana, 23.12.1974. BM. Figured by HOWARTH (1976); 1 ♂ Shaded secondary forest/scrub, east of Lake Wairafa, Santa Ana, 14.12.1974. SM.; 5 ♂ Santa Ana, 22.IV.1955, E. S. BROWN. BM.; 10 ♂ October 1932, Solomon Is., Santa Ana, R. A. LEVER. HEC.; 1 ♂ as before but Santa Catalina.

Larval food-plant: *Hoya* R. BR. (Asclepiadaceae).

Euploea boisduvali and *leucostictos* occur inland on Santa Ana; furthermore, WOODFORD (1890) remarks on their abundance in forest areas of San Cristobal, and relates to these the Nymphalid- *Hypolimnys alimena fuliginescens* MATHEW, the female of which exhibits a similar colouration and distribution of pattern. *Euploea nechos* and *treitschkei* feed from flowers of beachside trees, rarely flying far inland. Geoff DENNIS notes that *nechos* is often plentiful, the adults (sexes not recorded) congregating in groups of fifty or more, feeding on exudations from defoliated or otherwise damaged shrubs of *Tournefortia argentea* L. (Boraginaceae); in such instances there are often assemblages of small Coleoptera, particularly weevils, and colourful diurnal Heterocera.

Along the seashore, several milk-sap climbers of the family Asclepiadaceae occur, often in close association with *Tournefortia* L.; of these *Hoya* is definitely a host-plant to *Euploea* larvae.

On Guadalcanal, larvae of *E. treitschkei* were observed feeding on *Hoya guppyi* OLIVER, a native species with large red flowers often 26 mm in diameter. Metallic-silver pupae, characteristic of *Euploea* were also noted from the same vine.

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References

- AUBREVILLE, A. & J.-F. LEROY, 1976. Flore de la Nouvelle-Calédonie et Dépendances. Museum National d'Histoire Naturelle, Paris.
- BROOKFIELD, H. C. & D. HART, 1971. Melanesia—A geographical interpretation of an island world. Methuen, London.
- BROOKS, C. J., 1950. A revision of the genus *Tenaris* HÜBNER (Lepidoptera: Amathusiidae). *Trans. R. ent. Soc. Lond.*, **101**: 179–238, pl. 8.
- CARPENTER, G. D. H., 1942. Revisional notes on Melanesian *Euploea* (Lepidoptera) with descriptions of new subspecies and forms. *Proc. R. ent. Soc. Lond.*, (B), **11**: 127.
- 1953. The genus *Euploea* (Lepidoptera: Danaidae) in Micronesia, Melanesia, Polynesia and Australia—A zoogeographical study. *Trans. zool. Soc. Lond.*, **28**.
- CORBET, A. S., 1943. A key for the separation of the Indo-Australian and African species of the genus *Euploea*. *Proc. R. ent. Soc. Lond.* (B), **12**: 17–22.
- COWAN, C. F., 1970. Annotations Rhopalocerologicae. Berkhamsted, England.
- D'ABRERA, B., 1971. Butterflies of the Australian Region. Lansdowne, Melbourne.
- 1975. Birdwing Butterflies of the World. Lansdowne, Melbourne.
- EDGAR, J. A., 1975. Danainae (Lep.) and 1,2-dehydropyrrolizidine alkaloid-containing plants—with reference to observations made in the New Hebrides. *Phil. Trans. R. Soc. Lond.* (B), **272**: 467–476.
- ELIOT, J. N., 1973. The higher classification of the Lycaenidae—A tentative arrangement. *Bull. Br. Mus. nat. Hist.*, (Ent.), **28**: 373–505.
- EVANS, W. H., 1949. A catalogue of the Hesperidae from Europe, Asia and Australia in the British Museum (Natural History). BM., London.
- GREENSLADE, P. J. M., 1968. The distribution of some insects of the Solomon Islands. *Proc. Linn. Soc. Lond.*, **179**: 189–196.

- GUILLAUMIN, A., 1948. Flore de la Nouvelle-Calédonie. Office de la Recherche Scientifique Coloniale, Paris.
- HAUGUM, J. & A. M. Low, 1978–79. A Monograph of the Birdwing Butterflies, Vol. 1, part 1 & 2: (1) *Ornithoptera* (*Aetheoptera*) and (2) *O.* (*Ornithoptera*). Scandinavian Science Press Ltd., Klampenborg, Denmark.
- HEMMING, F., 1967. The generic names of the butterflies and their type-species (Lepidoptera: Rhopalocera). *Bull. Br. Mus. nat. Hist.*, (Ent.), Suppl. 9.
- HIGGINS, L. G. & N. D. RILEY, 1970. A field guide to the butterflies of Britain and Europe. Collins, London.
- HOLLOWAY, J. D. & N. JARDINE, 1968. Two approaches to zoogeography—A study based on the distributions of butterflies, birds and bats in the Indo-Australian area. *Proc. Linn. Soc. Lond.*, **179**: 153–188.
- HOPKINS, G. H. E. & P. A. BUXTON, 1927. *Euploea* species frequenting dead twigs of *Tournefortia argentea* in Samoa and Tonga. *Proc. ent. Soc. Lond.*, **1926**: 35–37.
- HOWARTH, T. G., 1962. The Rhopalocera of Rennell and Bellona Islands. *Nat. Hist. Rennell Is., Brit. Sol. Is.* **4** (37): 63–83, 10 pl.
- , A. KAWAZOÉ & A. SIBATANI, 1976. A new mimetic species of *Danaus* (*Tirumala*) from the Solomon Islands (Lepidoptera: Danaidae). *Tyô to Ga, Osaka*, **27**: 131–137.
- & T. RACHELI, 1975. Some observations on *Pachliopta polydorus* (Linnaeus) (Lepidoptera: Papilionidae) from the Solomon Islands. *Tyô to Ga, Osaka*, **26**: 8–13.
- LAITHWAITE, E., A. WATSON & P. E. S. WHALLEY, 1975. The Dictionary of Butterflies and Moths in colour. Michael Joseph, London.
- LEVER, R. A., 1936. Notes on *Euploea* and other Lepidoptera attracted to *Tournefortia* at Kolombangara, Solomon Islands. *Proc. R. ent. Soc. Lond.*, (A), **11**: 95–96.
- MATHEW, G. F., 1887. Descriptions of some new species of Rhopalocera from the Solomon Islands. *Trans. ent. Soc. Lond.*, **1887**: 37–49.
- MCCUBBIN, C., 1971. Australian Butterflies. Nelson, Melbourne.
- MEEK, A. S., 1913. A naturalist in cannibal land. T. Fisher Unwin, London.
- MILLER, L. D., 1968. The higher classification, phylogeny and zoogeography of the Satyridae. *Mem. Amer. ent. Soc.*, **24**.
- ROBINSON, G. S., 1975. The Macrolepidoptera of Fiji and Rotuma—A taxonomic and geographical study. E. W. Classey, Faringdon, Oxon.
- SAMSON, C., 1979. Butterflies (Lepidoptera: Rhopalocera) of the Santa Cruz group of islands, Solomon Islands. *Aurelian*, **1** (2): 1–19.
- SCHMID, F., 1970. Sur quelques sous-espèces d'*Ornithoptera victoriae* GRAY. *Nat. Can.*, **97**: 467–475.
- SEITZ, A. ed., 1908. Gross Schmetterlinge der Erde **9**. A. Kernen Verlag, Stuttgart.
- SHIRÔZU, T. & A. HARA, 1960 & 1962. Early stages of Japanese butterflies in colour, Vol. 1 & 2. Hoikusha, Osaka.
- SMART, P., 1975. The Illustrated Encyclopedia of the Butterfly World in colour. Hamlyn, London.
- SPARHAWK, W. N., 1945. Forests of the Pacific Area—Notes on Forests and Trees of the Central and Southwest Pacific Area. Forest Service, U. S. Dept. of Agric.
- STEARNS, W. T., 1966. Botanical Latin. Nelson, London.
- SZENT-IVANY, J. J. H. & J. H. BARRETT, 1956. Some insects of banana in the Territory of Papua and New Guinea. *P. & N. G. Agric. J.*, **11** (1): 1–5.
- , J. S. WOMERSLEY & J. H. ARDLEY, 1956. Some insects of *Cycas* in New Guinea. *P. & N. G. Agric. J.*, **11** (2): 1–4.
- Times Books & BARTHOLOMEW J. (1967; comprehensive ed. 1975). The Times Atlas of the world. Times Books, London.
- TITE, G. E., 1963. A synonymic list of the genus *Nacaduba* and allied genera. *Bull. Br. Mus. nat. Hist.*, (Ent.), **13**: 67–116.
- TUDOR, J. ed., 1972. Pacific Islands Year Book, 11th ed. Pacific Publications, Sydney.
- Van STEENIS C. G. G. J. ed., 1963. Pacific Plant Areas, I. Manila.
- WALKER, F. S., 1948; rev. 1962. The Forests of the British Solomon Islands Protectorate. Honiara & S. Pacific Comm., Nouméa.

- WATERHOUSE, G. A., 1932. "What Butterfly Is That?". Sydney.
- WHITMORE, T. C., 1966. Guide to the forests of the British Solomon Islands. Oxford Univ. Press.
- WILLIAMS, C. B., 1930. The migration of butterflies. Oliver & Boyd, London.
- 1958. Insect migration. Collins, London.
- WILLIS, J. C., 1973; rev. Airy SHAW H. K., Dictionary of Flowering Plants and Ferns, 8. Cambridge Univ. Press.
- WOMERSLEY, J. S., 1965, re-issued. Dictionary of Generic and Family Names of Flowering Plants reported from the New Guinea and South-west Pacific Region. Dept. of Forests, Div. of Botany, Lae.
- WOODFORD, C. M., 1885. Remarks upon Lepidoptera colected in the Ellice and Gilbert Islands. *Ann. Mag. nat. Hist.*, (5), **15**: 414-416.
- 1890. A naturalist among the Head-hunters—An account of three visits to the Solomon Islands in the years 1886, 1887 & 1888. George Philip, London.
- ZEUNER, F. E., 1945. Studies in the systematics of *Troides* HÜBNER and its allies; distribution and phylogeny in relation to the geological history of the Australasian Archipelago. *Trans. zool. Soc. Lond.*, **25**: 107-184.